REMARKS

Claims 1-17 have been amended. New claim 18 has been added. Claims 1-18 remain in the application. It should be appreciated that the new and amended claims merely clarify the invention and do not add new matter.

Claim 5 was rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. In particular, the Examiner states that Fig. 2 shows that the intelligent agent resides in a data communication bus rather than a wireless data communication. The claims have been amended to be consistent with the specification. The Applicant respectfully submits that this claim is in a condition for allowance, which allowance is respectfully solicited.

Claims 1-4, 6 7 and 12-17 were rejected under 35 U.S.C. §102(b) as anticipated by Borchers et al. (U.S. Patent 6,108,616). The Applicant respectfully traverses this rejection.

U.S. Patent Number 6,108,616 to Borchers et al. '616 discloses a structured multi-agent process diagnosis system. The distributed control system L includes diagnostic agents A at various levels. The agents A at a field level are part of intelligent field instruments 5 and on the area level B as part of the processing stations. The field level agents are used for early detection of fault causes, or malfunctions, on the basis of component faults. If this self diagnosis is not possible, a "good" state is modeled using neural networks. As shown in Fig. 3, a multi-agent uses a first and second slave agent and a neural network is integrated into each of the agents. A detected deviation is forwarded to the higher order diagnostic agent as a fault signal. The higher order agent sums the fault signals and performs the diagnostic task. If no fault is detected at the higher order agent, the higher order agent sends a "no fault" signal back to the lower-order agent. The lower order agent adapts to this new behavior. As shown in Fig. 5, the multi-agent system is adaptive. That is, if a neighbor agent is not available, the agent has to react. Also, the agent has

to react to a new agent. Fault detection includes the steps of the diagnostic agent at the lower level, detecting a fault and sending out a message to a higher order diagnostic agent. The higher order diagnostic agent processes the message and carries out an assessment. The higher order diagnostic agent may request information from other lower order agents. The system uses a stepwise process to output a diagnosis. The system also includes a fault localization feature at the level at which the fault is detected. The diagnostic agent at the level at which the fault is detected initiates fault localization in lower plant parts closer to the process. Using the knowledge about the detected fault, the diagnostic agents can request process information and separate out or confirm the cause of the disruption. Borchers et al. does not disclose a system and method of diagnosing and isolating malfunctions using a plurality of intelligent agents disposed in hierarchical levels, and the highest level intelligent agent is in communication with a remotely located knowledge database, as disclosed by the Applicant.

In contradistinction, claim 1 as amended discloses a method of utilizing model based intelligent agents for diagnosing and isolating malfunctions in computer-controlled machinery. The method includes the steps of disposing a plurality of intelligent agents in the computer controlled machinery in a plurality of hierarchical levels. Each intelligent agent has diagnostic capability relative to the hierarchical level that the intelligent agent is disposed in. The plurality of intelligent agents are in data communication with each other and with computer controllers for the machinery. The method also includes the steps of collecting data from a plurality of computer controllers disposed within the computer controlled machinery via at least one intelligent agent disposed in a first hierarchical level. The collected data is analyzed to obtain a first level of diagnostic information that is communicated to at least one intelligent agent disposed in a second hierarchical level. The method further includes the steps of employing the

at least one intelligent agent disposed in the second hierarchical level to perform a second level of diagnostic tasks on the first level of diagnostic information, to obtain a second level of diagnostic information. The second level of diagnostic information is communicated to at least one intelligent agent disposed in a third hierarchical level. The method further includes the steps of employing the at least one intelligent agent disposed in the third hierarchical level to perform a third level of diagnostic tasks using the second level of diagnostic information. The third level of diagnostic tasks includes analyzing the second level of diagnostic information relative to reference information obtained from a remotely located knowledge database, to accomplish fault isolation within the computer controlled machinery. Claim 13 is similar to claim 9 as amended, but includes further limitations.

Borchers et al. '616 does not disclose, anticipate or otherwise suggest the claimed invention of claim 1, or claim 13, as amended. Borchers et al. '616 merely discloses that the system includes an integrated neural network for learning a reference behavior of the components of the process being monitored and for enabling adaptation to a new reference behavior. The neural network is integrated into all of the agents, as shown in Fig. 3 and discussed in column 6, lines 55-67 and column 7, lines 1-18. Borchers et al. '616 does not disclose that the reference model is obtained from a remotely located central database, as taught by the Applicant. In fact, Borchers et al. '616 teaches away from the Applicant's invention, since the reference model is integrally learned by all intelligent agents in the multi-agent system, and not obtained by the highest level agent from a remotely located database. Further, there is no teaching in the disclosure of Borchers et al. '616 to even suggest that the reference model is obtained from a remotely located database.

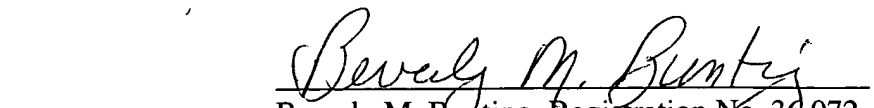
Therefore, it is respectfully submitted that claims 1 and 13 and the claims dependent therefrom are allowable over the rejection under 35 U.S.C. §102(b).

Claims 8 and 11 were rejected under 35 U.S.C. §103(a) as being unpatentable over Borchers et al. (U.S. Patent 6,108,616) in view of IPM article (IPM article, "Wireless Vehicle Interface). The Applicant respectfully traverses this rejection for the reasons set forth above with respect to independent claim 1. Therefore, it is respectfully submitted that claims 8 and 11 are allowable over the rejection under 35 U.S.C. §103(a).

Claims 9 and 10 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claims. Claims 9 and 10 have been amended accordingly. Therefore, it is respectfully submitted that claims 9 and 10 are in a condition for allowance, which allowance is respectfully solicited.

Based on the above, Applicant submits that the claims are in condition for allowance, which allowance is respectfully solicited. If the Examiner finds to the contrary, it is respectfully requested that the undersigned in charge of this application be called at the telephone number given below to resolve any remaining issues.

Respectfully submitted,



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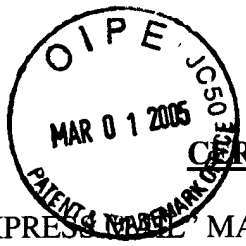

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Janice R. Kuehn